

1.1 lines, increments

Increments

a. How can you drag point P or Q so that only Δx changes?

horizontally

b. How can you drag point P or Q so that only Δy changes?

vertically

c. What are Δx and Δy ?

$$\Delta x = \text{change in } x \quad \Delta y = \text{change in } y$$

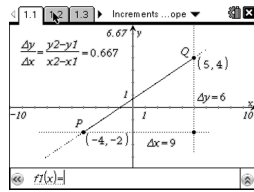
$$\Delta x = x_2 - x_1 \quad \Delta y = y_2 - y_1$$

d. What is the equation of the line through P and Q?

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6}{9} = \frac{2}{3}$$

$$y = \frac{2}{3}(x - 5) + 4$$

$$y = \frac{2}{3}(x - 4) - 2 \rightarrow y = \frac{2}{3}x + \frac{2}{3}$$



Definitions

$$\text{Slope } m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{Point-Slope Equation } y - y_1 = m(x - x_1) \quad \boxed{y = m(x - x_1) + y_1}$$

$$\text{Slope-Intercept Equation } y = mx + b$$

$$\text{General Linear Equation } Ax + By = C$$

Slopes of Parallel & Perpendicular lines

If $l_1 \parallel l_2$ then $m_1 = m_2$

If $l_1 \perp l_2$ then $m_1 = -\frac{1}{m_2}$

horizontal and vertical lines

$$y = 5 \quad x = 3$$

no slope $\text{slope} = 0$ $\text{slope is undefined}$ not a function

Aug 21-10:43 AM

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Write the point-slope equation for the line through $(-2, -1)$ and $(3, 4)$

$$m = \frac{4 - (-1)}{3 - (-2)} = \frac{5}{5} = 1$$

$$y = 1(x - 3) + 4$$

$$y = 1(x + 2) - 1$$

$$\rightarrow y = x + 1$$

Write an equation for the line through the point $(-1, 2)$ that is (a) parallel, and (b) perpendicular to the line $L: y = 3x - 4$

a) slope = 3

$$y = m(x - x_1) + y_1$$

$$y = 3(x + 1) + 2 \rightarrow y = 3x + 5$$

b) slope = $-\frac{1}{3}$

$$y = -\frac{1}{3}(x + 1) + 2 \rightarrow y = -\frac{1}{3}x + \frac{5}{3}$$

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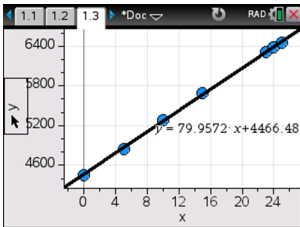
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Find the relationship between Fahrenheit and Celsius temperature. Then find the Celsius equivalent of 90 degrees Fahrenheit and the Fahrenheit equivalent of -5 degrees Celsius

Aug 21-11:16 AM

Regression: Starting with the data in the table, build a linear model for the growth of world population. Use the model to predict the population in the year 2010.

Year	Pop
1980	4454
1985	4853
1990	5285
1995	5696
2003	6305
2004	6378
2005	6450



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